

*"Few challenges facing America – and the world – are more urgent than combating climate change. The science is beyond dispute and the facts are clear. Sea levels are rising. Coastlines are shrinking. We've seen record drought, spreading famine, and storms that are growing stronger with each passing hurricane season. Climate change and our dependence on foreign oil, if left unaddressed, will continue to weaken our economy and threaten our national security...Now's the time to confront this challenge once and for all. Delay is no longer an option. Denial is no longer an acceptable response. The stakes are too high. The consequences, too serious."*

***President-elect Barack Obama***

***November 18, 2008***

*Video Address, Governor's Global Climate Summit*

*Los Angeles, CA*

These words are not just a wake-up call that the world is at risk. They are a call to action for all nations, all leaders, all people to change the status quo. This is not a trend. This is a mandate for change. Former Vice President Al Gore and the United Nations Intergovernmental Panel on Climate Change were awarded the 2007 Nobel Peace Prize for their efforts to address the challenges of global warming. California Governor Arnold Schwarzenegger organized an international conference for more than 800 world leaders to find solutions to these challenges before it is too late. The state policies already enacted by Schwarzenegger promise to become a model for the new Administration's environmental policy.

Long before these issues hit the global stage, San Luis Obispo County has insisted on environmental sensitivity – enacting policies and general plan language intended to preserve this unique region and reduce greenhouse gas emissions. Now is the time to realize the intent of those policies. Now is the time to harness the sun. The California Valley is the place and SunPower Corporation, Systems (SunPower) is ready to lead the way.

With more than 500 solar commercial and power plant installations worldwide and a twenty-five year history of success delivering high-efficiency solar power, SunPower has emerged as a respected industry leader. The SunPower solution is ideal. It delivers cost-effective, renewable energy, maximizes existing infrastructure and relies on highly efficient, proven technology to realize county and state energy goals with the least environmental impact of any other solar system.

SunPower is requesting approval from the County to create the California Valley Solar Ranch (Solar Ranch), a 250 Megawatt (MW) photovoltaic facility to be located in the California Valley. This tilted-tracking system will produce enough energy to power approximately 90,000 homes and could start delivering some of that energy as early as 2010. Pacific Gas & Electric (PG&E), under mandate to increase renewable energy to customers by 2010, has already contracted to purchase all power generated at the Solar Ranch.

SunPower is committed to working in concert with area residents, elected officials, agency staff and others to gain approval for the California Valley Solar Ranch. With its long experience and proven leadership in solar power, SunPower will help San Luis Obispo County meet the challenge of climate change with a signature project that sets a national and global standard for generating renewable energy and combating global warming.

## **PROJECT SUMMARY**

SunPower proposes to construct and operate a 250 Megawatt (MW) photovoltaic (PV) solar electric system. The energy generated will be sold under contract to Pacific Gas & Electric (PG&E) in support of its requirement to reach 20% renewable energy delivery by 2010, as mandated by California's Renewable Portfolio Standard (RPS).

Major elements of the project include eight solar PV arrays, electrical equipment, a transmission line, a substation, and a switchyard. The project includes a Visitors Center, an Operations & Maintenance Building (O&M Building), and a water tank. Three public viewing sites will be created. Site access is from SR-58.

The parcels available for the project comprise an area of 4,365 acres straddling SR-58. However, the proposed design confines the solar arrays, substation, and facility buildings to a footprint of 1,966 acres south of SR-58. The remaining 2,399 acres outside the project footprint will be left undisturbed.

North of SR-58, the only project elements proposed are a 2.5 mile transmission line and a switchyard to interconnect to PG&E's existing 230kV Morro Bay-Midway transmission line.

Solar energy will be captured and converted directly to electricity through solar PV panels. The PV panels will be attached to SunPower T20 tracker units. Individual trackers are positioned above the ground at angle of about 15-20 degrees toward the south. The maximum tracker unit height is approximately 15 feet and the minimum clearance is approximately 4 feet above the ground.

Each tracker is self-ballasted through mounting on three foundations, two on the north and one on the south. The foundations are placed directly on the surface of the ground without need for excavation. Adjacent trackers share a north foundation which is approximately 9' long by 2' wide. South foundations are approximately 3' in diameter. The tracker foundations extend approximately 2' above the ground.

The space and ground beneath the trackers is open. As the sun arcs across the sky, it sweeps across the ground beneath the trackers. No permanently shaded areas are created by the panels mounted in this configuration. Existing vegetation is able to continue to grow, and small mammal species are able to inhabit the area around and under the trackers.

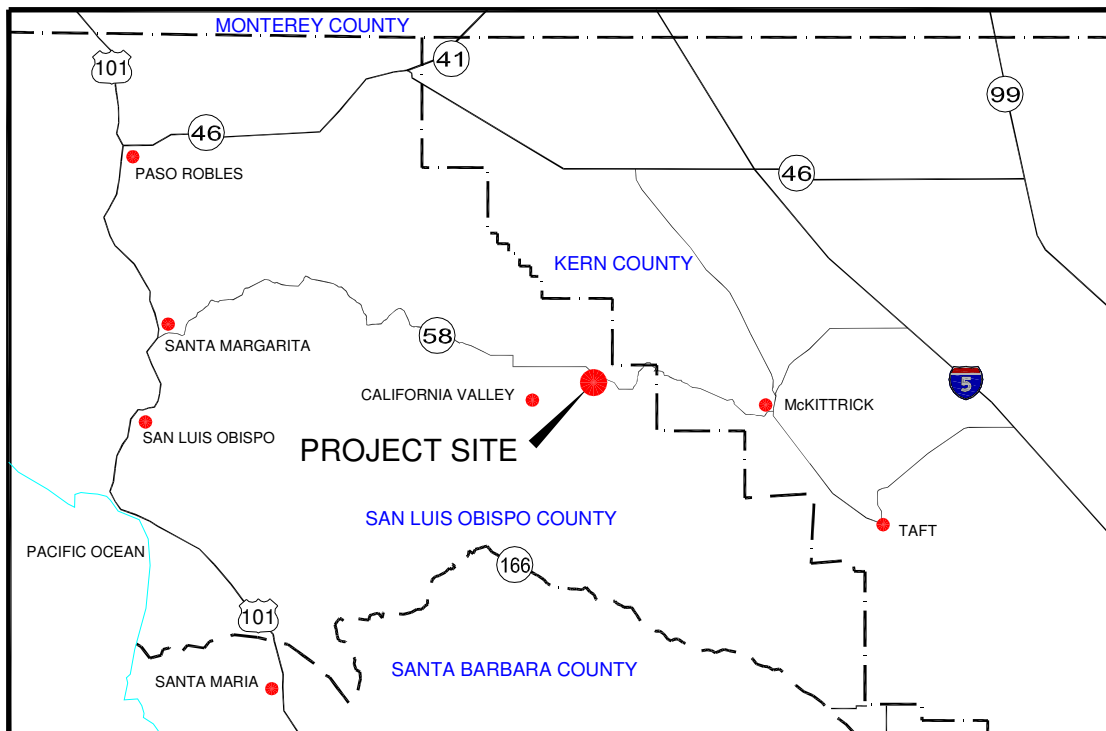
Individual tracker units are aligned, linked together in rows of up to 72 trackers, and attached to a ½ HP drive motor. The drive motor rotates the entire tracker row to follow the sun across the sky to maximize energy capture.

The project will generate renewable energy for delivery to PG&E under a long term contract. Final design and engineering considerations may result in a project that is up to 20% larger in rated capacity and energy delivery to conform to the terms of the energy contract. This potential increase would be within the proposed project footprint and other design parameters described in this application.

## **LOCATION**

The proposed Solar Ranch will be located on an abandoned ranch immediately north of California Valley at the northeastern fringe of the Carrizo Plain in southeastern San Luis Obispo County. The site is adjacent to the Temblor

Range, 56 miles east of San Luis Obispo and 52 miles southeast of Paso Robles. The overall site is bisected by State Highway 58 (SR-58). The solar facility and all associated components and improvements will be located south of SR-58 on property under option for future ownership by SunPower. North of SR-58, a 250' transmission line easement is proposed to extend over privately-owned land to the Pacific Gas & Electric (PG&E) transmission lines 2.5 miles to the north.



## SITE SELECTION

SunPower considered three primary requirements in selecting the best site for this new solar facility: access to electrical transmission lines with available power capacity; suitable land; and high solar resource.

Some of California's best renewable energy resources are remote and lack adequate transmission infrastructure, such as the Tehachapi Mountains (wind) and the Mojave Desert (solar thermal). While efforts are underway to build new transmission corridors to these areas, none will be completed in time to contribute to the state's Renewable Portfolio Standard (RPS) which mandates each investor-owned utility to deliver 20 percent of its electricity from renewable energy sources by the year 2010.

Of the state's existing transmission lines, few have the available capacity to integrate additional power generation without cost-prohibitive upgrades. The transmission line north of the proposed Solar Ranch site – the PG&E-owned Midway-Morro Bay transmission line – does have the available capacity to accept significant additional power generation. This line runs from Morro Bay, across San Luis Obispo County, to the Midway substation at Buttonwillow, near the intersection of SR-58 and Interstate 5. Previously used to export power from the natural-gas-fired power plant at Morro Bay to Fresno and Bakersfield, the line now transmits only a fraction of its total capacity due to a reduction in the plant's energy production.

When considering land suitability near the Midway-Morro Bay transmission line, SunPower reviewed the site's topography, agricultural viability, and current use. The site's topography, with its low slope, allows SunPower's T20 Tracker systems to be placed on the ground with minimal disturbance, following the contours of the land.

Unsuited for sustainable irrigation, the site has low agricultural resource value limited to dry land farming and grazing. Irrigated, productive agricultural land was also excluded from consideration due to its higher value for crop production. Land preserved for agriculture under the California Land Conservation Act of 1965 ("Williamson Act") was also excluded from siting consideration.

Currently, the site sustains a small number of cattle for grazing and consists of a privately-owned, abandoned ranch complex and an inactive gypsum mine. The ranch structures are in disrepair and largely collapsed. Although its permit is still open, the site's gypsum mine has been inactive for decades and rusted strip-mining equipment still sits idle adjacent to the mine area. SunPower plans to reclaim the mine site and close its permit.

The most important factor SunPower considered in selecting this site was the solar resource available. The solar resource is the percentage of available sunlight that can be converted into electricity. The area around California Valley has the highest solar resource in PG&E's service territory and is identified by the San Luis Obispo County General Plan's Energy Element as an area of high solar potential where solar energy development should be encouraged.

California Valley's very nature makes it the ideal location for solar energy production. It is protected from coastal fog by the Coastal and La Panza mountain ranges to the West. The Temblor Range to the East protects it from San Joaquin Valley ground fog. The weather in California Valley is stable, marked by very low rainfall, moderate temperatures and consistent sunshine. At an elevation near 2100 feet, this microclimate contains air that is dry and relatively low in particulate matter, boosting the sun's intensity.

## **GENERAL PLAN / ZONING**

All property parcels within the site, including the proposed transmission line easement, are designated in the County General Plan as Agriculture, and are flanked on the north, east and west by property designated as Agriculture. Parcels outside, and immediately south, of the proposed site have a land use designation of Residential Suburban (RS) within the village of California Valley.

California Valley is comprised of approximately 7,200 – 2.5-acre parcels. These parcels were created in 1960 and have remained mostly undeveloped since that time.

## **PROJECT BENEFITS**

The solar electric power generated by SunPower's proposed Solar Ranch is a 100% renewable energy source that is clean and quiet, producing no emissions, requiring no fuel, and needing only minimal water for periodic washing. By producing enough energy to power nearly 90,000 homes, the Solar Ranch will remove 312,500 tons of carbon emissions from the air each year. This is equivalent to the carbon emitted from the consumption of one million barrels of oil per year or to taking 615,500 vehicles off the road over the life of the project.

Surface-mounted trackers minimize impact on local species and vegetation. Trackers rest lightly on the land, allowing sun, air and rain to reach the landscape below. Adjustable tracker legs allow each tracker to adjust to the topography, minimizing the need for grading.

In addition to these environmental benefits, San Luis Obispo County can anticipate several economic benefits from the proposed solar facility. Expected to create over 200 jobs at the peak of the project's 2.5 year installation period, SunPower will rely on the local labor pool for skilled electricians, technicians, construction workers, and laborers.

Approximately \$50 million in property and sales tax assessments will generate added revenue for the County throughout the life of the facility. A portion of these new funds will be shared by the Atascadero School District, San Luis Obispo County Sheriff's Department and others.



California Valley Solar Ranch promises to be a “best-practices,” renewable-energy model that will be studied by communities nationwide, affording the County an opportunity to emerge as a national leader in renewable energy generation. Sun Power is working with the San Luis Obispo County Economic Vitality Corporation, local business groups and educators to position the County at the forefront of this new green industry – as a region that will produce the nation’s green leaders and educate its green collar specialists.

## **REGULATORY BACKGROUND**

The State of California faces two fundamental energy challenges. First, the state’s economy ranks twelfth in the world for carbon emissions. Second, energy must be imported from outside the state to meet consumer demands, much of which comes from coal plants which emit large amounts of greenhouse gases. According to the Californai Energy Commission, about 30% percent of all electricity used in California originates from out of state yet this accounts for 48% of California’s greenhouse gas emissions from electrical production. In response, California Governor Arnold Schwarzenegger and state leaders have passed legislation designed to reduce carbon emissions and generate new in-state energy sources.

In 2006, the state legislature passed the California Global Warming Solutions Act (AB 32) which mandates for the first time ever in the U.S. the reduction of greenhouse gas emissions to 1990 levels by 2020. AB32 places California at the forefront of market-based greenhouse gas reduction mechanisms that are both quantifiable and cost-effective.

California Valley Solar Ranch will also significantly contribute toward reaching California’s Renewable Portfolio Standard (Senate Bill 1078, known as “RPS”),

which mandates each investor-owned utility to deliver 20 percent of its electricity from renewable energy sources by the year 2010. The Solar Ranch will assist PG&E in meeting these requirements with the utility's commitment to purchase the entire power output of the Solar Ranch, as announced in August 2008.

California has established a further goal of reaching a 33 percent RPS by 2020. California is a national leader in green technologies. The California Valley Solar Ranch and like projects are central to national efforts to leverage renewable energy as part of the national strategy in responding to the climate crisis.

In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, establishing targets, goals, and directives for California state agencies to streamline the process of approving solar projects. The California Legislature is expected to follow suit and pass supporting legislation in 2009.

San Luis Obispo County, through its General Plan, has adopted policies similar to those of the state in support of sustainable and renewable energy generation.

California Valley Solar Ranch will directly support goals stated in the San Luis Obispo County *Energy Element* as well as other policies in the General Plan designed to protect the County's environment and economy. With the deployment of the Solar Ranch, San Luis Obispo County has an opportunity to position itself as a catalyst towards California's renewable energy future.

## **ABOUT SUNPOWER**

California Valley Solar Ranch (Solar Ranch) will be owned by High Plains Ranch II, LLC, a wholly-owned subsidiary of SunPower Corporation, Systems (SunPower). SunPower is a vertically-integrated company that designs, manufactures, delivers and monitors high-performance solar electric systems worldwide for residential, commercial, and utility customers (NASDAQ:SPWRB). This vertical integration ensures that SunPower has adequate PV supply, on-time project completion, component quality assurance, and reliable performance. In business since 1985, SunPower has successfully delivered utility-scale solar power systems in the United States, Europe and Asia since 2004.

SunPower manufactures and installs the world's highest performing solar photovoltaic (PV) systems using the highest efficiency solar PV panels commercially available. SunPower has an unparalleled record of on-time delivery of complex projects and reliable operation for the life of the system. More than 500 SunPower commercial and power plant installations provide more than 400 MW to businesses and utilities worldwide. SunPower is a leader in serving all market segments, including:

### **Residential Retrofit**

- Largest installed base of residential rooftop systems on existing homes in North America

### **New Home Construction**

- Largest installed base of residential roof-integrated solar systems on new homes in North America

### Commercial and Public Sector

- Largest installed base of solar systems on commercial and public buildings in North America

### Utility Renewable Generation

- Global pioneer in utility scale solar installations
- Largest utility-scale solar PV system in North America at Nellis Air Force Base, Las Vegas

SunPower has over 5,000 employees; U.S. offices in California, New Jersey and Hawaii; and an international presence spanning four continents. Over 250 MW of SunPower's power-tracker technology has been deployed around the world. SunPower's design and project management team's proven record ensures PV systems are installed on time and in accordance to all national, state and local standards.

SunPower's solar cells, solar panels, and tracking systems are designed and built to maximize power from each system, utilizing advanced technology while adhering to the most stringent safety requirements. With typically 50% greater yield than conventional solar panels, economic and environmental efficiencies are gained through lower land use intensity and high energy production. For this reason, SunPower's projects consistently meet or exceed initial solar power production estimates.

## SYSTEM TECHNOLOGY

Specifically developed for utility-scale applications and supported by numerous U.S. and international patents, SunPower's T20 Tracker System uses the most efficient solar cells to produce the most power in the smallest possible footprint.

Trackers rest lightly on the land, allowing sun, air and rain to reach the landscape below.

The T20 Tracker combines solar technology performance with system durability. By tilting the solar panels at 15-20 degrees and tracking on a single-axis to follow the path of the sun throughout the day, the T20 Tracker generates 30% more energy than a traditional fixed-tilt system. This efficiency allows for increased energy output from a smaller footprint system.

The T20 Tracker also combines substantial energy output with high system reliability and low operating costs. While the solar panels' output is warranted for 25 years, SunPower expects the system to remain productive for 35 years or more.

### Modular Design

The T20 Tracker System has been developed according to a modular *building block* principle, where a *block* is defined as a readily deployable grouping of trackers. Each building block is mechanically independent and electrically optimized. Each row is controlled by a single drive unit. This makes each array mechanically independent, modular, and scalable.

#### Benefits:

- rapid, orderly deployment
- reduced electrical installation and maintenance costs
- accommodate site layout and topography



T20 TRACKER BUILDING BLOCK

### Prefabricated Tracker Units

T20 Tracker units will be pre-assembled in a temporary on-site production facility.

#### Benefits:

- rapid deployment, significantly reducing deployment time
- enhanced quality control
- installation possible in a variety of weather conditions, streamlining deployment



PREFABRICATED T20 TRACKER UNITS

### Above-Ground Foundations

The T20 Tracker utilizes precast foundations that sit directly on the ground.

#### Benefits:

- limited disturbance to soil and, thereby, limited impact on the environmental and native species
- relocation possible
- simplified dismantling process

### Adjustable Assembly

Adjustable, telescoping legs allow tracker positions to follow site terrain.

Individual T20 units are hoisted into place while installers adjust the tilt and orientation as needed via the telescoping legs.

#### Benefits:

- conforms to existing topography
- limited soil disturbance / minimal grading required



### Advanced Control System with GPS Timekeeping

The T20 Tracker's advanced system controller continuously determines the optimal tracking angle for the array based on the current time and date, as well as the array's geographic location, as determined by the built-in Global Positioning Signal (GPS).

The GPS and tracking algorithms determine in which direction the trackers point. A precision inclinometer controls the specific angle of tilt. At night, the array is stowed at a slight angle to enable rain showers to clean the panels and then drain without ponding or collecting dirt.

#### Benefits:

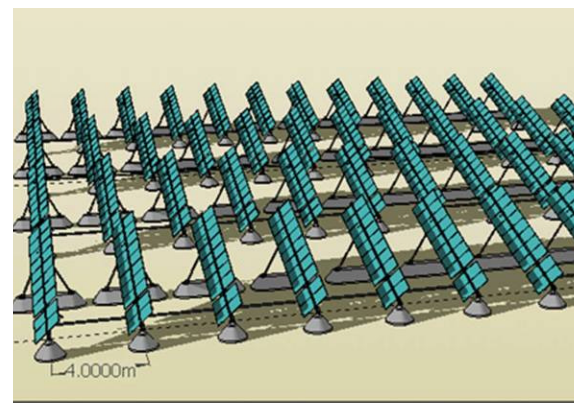
- Highly precise tracking of the sun, allowing for the maximum amount of harvested sunlight.

### Backtracking

When the sun is low on the horizon (early morning, late afternoon), the tracker units may be tilted to the point where they begin to cast shadows on each other. To avoid this, the T20 Tracker controller makes small adjustments (backtracks) to the trackers' tilt to ensure un-shaded exposure until the sun rises high enough in the sky, or until it has completely set for the night.

#### Benefits:

- maintains equal illumination on each cell at all times, maximizing power output
- prevents "hot spots" which can accelerate the degradation of the solar panels



TRACKING WITHOUT BACKTRACKING

## **SYSTEM COMPONENTS**

### PV Modules

Photovoltaic (PV) panels consist of silicon solar cells that are assembled into modules to convert sunlight directly into electricity. Silicon-based solar PV cells are the predominant form of the technology having a proven track record of over 50 years of operation.

### Drive Unit

Within each array, multiple rows of tracker units are linked by a steel drive strut, which is oriented perpendicular to the axis of rotation. Each row is connected to the drive strut by a torque arm, which acts as a lever, enabling the drive strut to rotate the rows together. The drive unit (a ½-horsepower, bi-directional AC motor) moves the drive strut forward and backward and is typically mounted in the center of an array row.

### Tracker Controller

Self-contained industrial control computer that incorporates all of the software needed to run the system. An included LCD monitor displays calibration parameters and status values, enabling field adjustment, calibration, and testing.

### Steel Tracking Structure

Square torque tubes stabilize and secure the T20 Tracker to a rigid frame able to withstand high-wind conditions. The metal structural elements are constructed of corrosion-resistant galvanized steel.

### DC-AC Inverters

Inverters take the direct current (DC) output of the panels and convert it to alternating current (AC) for delivery to the transmission grid via the project medium voltage collection system, substation, and switchyard. Automatic



operation includes start-up, shutdown, self-diagnosis, and fault detection. Anti-islanding protection prevents the back-feeding of system-generated power to the grid in the event of a utility outage.



### Data Acquisition System

Integrated with the inverter, this system includes a data logger and sensors to record AC power (kW), ambient temperature ( $^{\circ}\text{C}$ ), irradiance ( $\text{W}/\text{m}^2$ ), and wind speed (m/s), and enables system data transfer and performance monitoring in the project's operations center.

## **TEMPORARY FACILITIES**

California Valley Solar Ranch will contain the following temporary facilities during the site's installation period:

### Covered Assembly Areas

- Two temporary covered assembly areas: each 39,400 feet in size and 35 feet high. (See Sheet A1.0)
- Gable Style shelter with frame of heavy duty 4inch square galvanized steel tubing fabricated into 42 inch deep truss ribs on 20 feet centers with 20 oz. heavy duty white translucent vinyl fabric reinforced with polyester cord scrim. No end walls. (See Sheet A2.4)
- Self-cleaning PVDF resin fabric coating to enhance fire, UV and chemical aging resistance.

### Concrete Batch Plant

- 8,100 square feet site identified for site specific engineering design. (See Sheets A1.0 & C2.1, Detail 1)
- Two temporary 5,000 gallon portable tanks may be used for concrete batch plant operations during fabrication and construction.
- Final designs have not yet been determined but the batch plant equipment we are evaluating is 47' tall which is proposed in this application. (See Sheet C2.1, Detail 2)

## PERMANENT FACILITIES

When fully installed, the Solar Ranch will contain the following permanent structures and features:

### Photovoltaic Arrays

- Photovoltaic solar panels will be mounted on SunPower T20 Tracker units which will be arranged in eight large arrays. (See Sheet C1.0)
- Each array contains perimeter and internal fire access roads and electrical utilities to support the array. (See Sheets C3.0 and C5.0)
- Up to 80,000 SunPower T20 Tracker units (See Sheets E1.0 and E1.1) will be installed as part of the project.
- Tracker units are composed of a collection of solar panels fitted to a galvanized steel rack. The tracker units are linked together and attached to a drive motor in long rows. These tracker rows are laid out parallel to one another to create an array, with space between each row to avoid one row shading the next. Typical tracker row configuration includes up to 72 Tracker units sharing a centralized tracker drive motor assembly that controls the angle of the tracker units in relationship to the sun through the day. (See sheet C3.1)
- The tracker units will be tilted to the south and angled at 15-20 degrees in the vertical plane. Each tracker unit's high end will be approximately 15 feet above grade. The low end will be approximately four feet above grade. (See Sheet E1.1)
- Electrical energy generated by the tracker units is gathered via an underground collection system to centralized inverters. Inverters will be sized according to final design and engineering requirements. Inverter spacing in the array field will be dependent upon final engineering specifications with between 250-1,000 inverters required. (See Sheets C5.0, E2.0 and E3.0)

- The T20 Tracker System has a minimum 30-year design life and has a proven record of reliability in the field, requiring virtually no maintenance. Metal structural elements are constructed of corrosion-resistant, galvanized steel. The drive motor is a robust hardware design with nearly 40 years worth of field operational experience.
- Tracker units are installed with minimal penetration to the existing ground on precast concrete base units that are placed at surface level on the ground. (See Sheet E1.1)

### Collection Lines

- Electrical energy is gathered from the inverter units and transmitted at 34.5kV to the Substation via a system of Collection lines.
- Collection line designs will be composed of three pole styles which range in height from 35'- 60' tall. (See Sheets C5.0 and E3.0)
- Electricity flows from the arrays to the inverters. From the inverters the electricity flows through Collection lines to the substation over 34.5 kV medium voltage overhead lines. The substation steps up the voltages from 34.5 kV to 230 kV.

### Substation

- Located on the north side of Array 3, approximately 1200 feet west of the main entrance road and 1037 feet south of SR-58. (See Sheet C1.2)
- Substation equipment will cover an area of approximately 3.5 acres, surfaced with compacted road base all within the existing proposed fence line of the project. Substation equipment ranges in height from 24' to 61'. (See Sheets E5.0 & E6.0)
- Served by an internal access road from within the project.

### Transmission Line

- The proposed overhead transmission line is a 230kV high voltage connection running approximately 2.5 miles between the project Substation and the project Switchyard which is the point of connection to the PG&E system. (See Sheets C1.1 and E4.0).
- The transmission line over much of its length is off the project site proper and is located within a transmission line easement.
- The transmission line easement is 250' wide and approximately 2.2 miles in length. (See Sheet E1.1)
- The transmission line runs in three northerly straight line segments and is supported by 14 single column steel poles which vary in height from 85' to 110' above ground level. (See Sheet E4.0)
- The transmission line is built with two types of poles of which four (4) are dead end or angle supporting poles and ten (10) are straight line poles. (See Sheet E4.0)
- The preliminary design of the transmission line is shown in Sheet E4.0. Placement locations, types and height of poles are shown over length of the transmission route. Final design depends on detailed engineering and surveying work.

### Switchyard

- The Switchyard will connect the transmission lines to the electrical Collection grid at PG&E's existing Morro Bay-Midway 230 kV transmission lines.
- The Switchyard is immediately south of the existing PG&E 230 KV transmission line. (See Sheets C1.1 & C4.3)
- The Switchyard will occupy 2.25 acres of fenced area within a total disturbed area of 5.7 acres. The fenced Switchyard area is surfaced with a combination of concrete pads, compacted road base for internal access roads and compacted earth. (See Sheet E5.0)

- Switchyard equipment ranges in height from approximately 20' to approximately 50'. (See Sheet E6.0)

#### Operations and Maintenance Building

- 20,550 sq ft. in size with a maximum height of 25'
- Includes office space, storage conference room receiving docks and an open hanger area (85% of the space). (See Sheets C1.0, A1.0 & A1.1)
- Construction materials will include zinc cladding, corrugated metal siding, translucent polycarbonate, COR-TEN steel panels, low-e glazed windows, and standing seam metal roofing. (See Sheets A2.2, A2.3 & L4.2)
- Outdoor storage for road maintenance materials, non-operational equipment and maintenance vehicles will be located in the fenced laydown yard south of the O&M building. (See Sheet A1.0)

#### Visitors Center

- 1,922 sq ft in size with a maximum height of 16'
- The Visitors Center is located directly adjacent to the O&M Building. (See Sheets C1.0, A1.0, & L4.0)
- Built off-site as a modular building.
- Includes exhibit space, office, storage spaces and a unisex restroom. (See Sheet A1.1)
- Construction materials will be the same as those for the O&M Building. (See Sheets A2.2, A2.3 & L4.2)

#### Viewing Summits

- Three outdoor viewing summits will offer visitors expansive views of the site's arrays and will be accessed by hiking trails. (See Sheets C1.0, C4.5, C4.6 & L4.0)
- The largest of the three is the Summit Overlook which will be a 1.5 mile walk up to the top of the hill northwest of the Visitors Center. The Summit

Overlook will be 973 sq ft in size and constructed of rammed earth with a vegetated roof of indigenous grasses. (See Sheets A1.0, A1.1, A2.0 & A2.1)

- Another, the Sunset Overlook, is on the same path at a lower elevation requiring a 0.8 mile walk. (See Sheet L4.1)
- The Sunrise Overlook is on the east side of the project off of Baker Road. (See Sheet L3.0)

### Main Access Roads

- The main access road will enter the site from SR-58 at the location of the existing ranch road. The existing ranch road will be improved to a 24' wide section surface with aggregate base.
- See Sheets C3.0 and C4.7 for alignment, right-of-way, width, and cross sections.

### Fire Access Roads

- Fire access roads will have a 24' based section and will surround large blocks of trackers within each array.
- A 12'-wide based road will lead from the Visitors Center to the site's water tank.
- See Sheets C3.0 and C4.7 for alignment, right-of-way, width, and cross sections.

### Highway Signage

- Monument signage will mark the intersection of the main project entry, Boulder Creek Road with SR-58, to announce the project to visitors. The signage will be supported by rammed earth columns set in a landscaped area of enhanced native vegetation. (See Sheets L1.0, L2.2, & L2.3)
- Signage will be letters cut out of COR-TEN steel panels (with an appearance of rust). (See Sheets L2.2 & L2.3)

### Security Fencing

- A perimeter eco-friendly link security fence will be set back from the arrays by 35 feet and will be no closer than 260 feet from SR-58. (See Sheets C1.2 & L2.1)

### Water Tank

- A 271,000 gallon water tank will be located approximately 4,000 feet northwest of the O&M Building and Visitors Center at 2,091 feet in elevation. (See Sheet C4.5, C5.0 & L4.0)
- The tank is designed to meet both water supply and fire safety requirements.
- The tank will be 48 feet in diameter and 20 feet tall. This tank will be entirely buried on the uphill side and partially buried on the downhill side, in order to reduce its visual mass. (See Sheet L4.1)

## **STRUCTURES**

California Valley Solar Ranch will include three permanent structures: an O&M Building (20,550 sq ft, 25'-9" high); a Visitors Center (1,922 sq ft, 16' high) and a summit overlook structure (973 sq ft, 13' 10" high). (See A Sheets)

Temporary structures used during installation and then dismantled will be two covered assembly areas (each 39,400 sq ft, 35' high) and a concrete batch plant (8,100 sq ft, 47' high). (See Sheets A1.0, A2.4 and C2.1) These installations will be located adjacent to the Visitors Center and O&M Building.



## DESIGN ELEMENTS & VISITOR EXPERIENCE

California Valley Solar Ranch will incorporate green building principles and reflect the area's natural landscape. Visitors will exit SR-58 at the main project entry, Boulder Creek Road, and enter the mechanical center of the site. (See Sheet C3.0) A gentle downhill slope through rows of trackers will end at the site's only buildings (Visitors Center and O&M building), located behind a grove of cottonwood trees. From a shaded parking area, visitors will pass the O&M building (See Sheets L4.0, L4.2, A2.2 and A2.3) – a clean and efficient facility built with simple materials and designed to maximize natural light.

The Visitors Center will be located to the west of the O&M building. (See Sheet A1.1) The center will feature a large exhibition space overlooking the former gypsum mine – a remnant of past operations, now used to retain and filter storm runoff from the site.

To view the property, visitors will leave the center along a path that crosses a wash and progresses up a slight hill. Leading past a small group of trees and around a ridge, the path will continue up a hill to the Summit Overlook. Designed to complement the subtle topographic character of the region, the Summit Overlook is located below grade. (See Sheets A1.0, A2.0, A2.1 and L4.0) Native grasses flow over the roof, and visitors descend between earthen walls into an airy chamber framing a panoramic view of the arrays. In addition to the views from the Summit Overlook, the trail to the Summit Overlook also features a Sunset Overlook with views to the west. (See Sheets C4.5 and L4.0 and L4.1)

On the east side of the project off of Baker Road the project includes a corresponding Sunrise Overlook which features a small parking area and a trail to the top of a small ridge with eastward views and views of the adjacent San Andreas fault scarp. (See Sheets C4.6 and L3.0)

Access to all three viewing area will be via compacted and stabilized, decomposed granite hiking trails colored to match the soil.

## **LANDSCAPE DESIGN**

The landscape design of the California Valley Solar Ranch is consistent with the existing botany and visual quality of the site. (See Sheet L1.0) Visual and physical impacts will be minimized and areas which are disturbed during installation will be reseeded according to the projects detailed Draft Revegetation Plan to reestablish existing native species. (See Sheet L5.0) Additional plants that are indigenous to the region will also be included to create more diversity and animal habitat.

If necessary, supplemental irrigation will be applied to help establish new plant materials. To conserve water, these supplemental irrigation systems will minimize runoff, over-spray and daytime evaporation. Once the plantings are established, the irrigation systems will be removed. (See Sheet L4.1)

Native plants will screen views of public areas and maintain the site's natural character. Native shrubs and grasses will be planted as a visual buffer for the fence along SR-58, adjacent to the water tank and near the Visitors Center. (See Sheets L2.2, L2.3 and L2.4)

The design of all signs, monuments, walls and other structures will blend into the natural environment or reflect the area's ranching background.

## **PRELIMINARY ENGINEERING DESIGN**

North Coast Engineering (NCE), based in San Luis Obispo County, provided civil engineering and land surveying services for California Valley Solar Ranch. NCE determined the boundary of the Solar Ranch arrays and transmission easement based on a detailed analysis of recorded area maps. These boundaries were plotted onto a topographic map with 5' interval contours to create the base for the project. NCE is preparing a Record of Survey to document property boundaries.

A hydrological review of the site analyzed both on- and off-site drainage conditions. (See Appendix D) Based on these hydrologic and topographic maps, a preliminary engineering design was crafted around the following objectives:

- Low impact development
- Minimal permanent site disturbance
- Minimal temporary site disturbance
- Minimal or no change to existing drainage patterns
- Reclamation and enhancement of the existing gypsum mine
- Storm water quality and drainage infrastructure improvement
- Restoration of areas of temporary disturbance post installation
- Compatibility with existing species and habitat

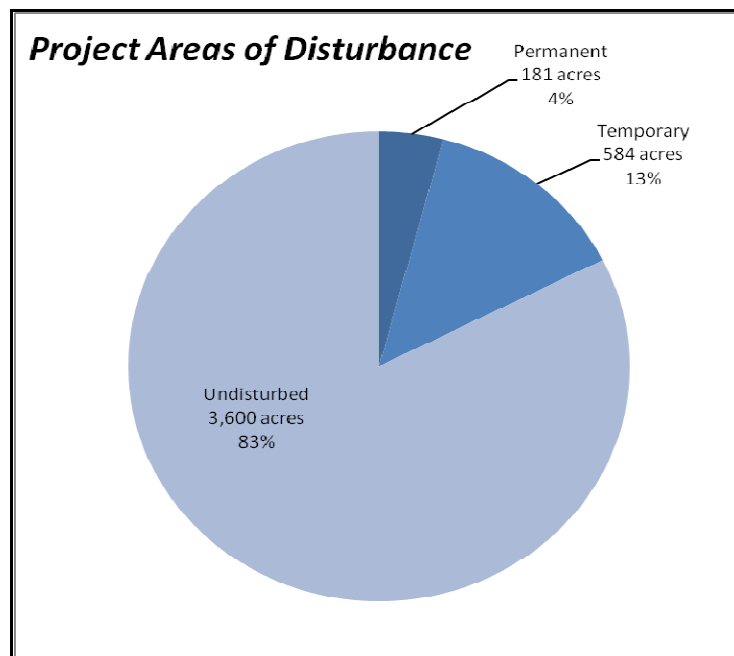
NCE's topographic maps revealed slopes of five percent or less throughout a majority of the site. Here, SunPower's solar tracker units require no grading prior to installation. They are able to be placed directly on existing ground cover without disturbing the existing ground cover.

## SITE DISTURBANCE

Permanent disturbance to the site consists of: access roads, structures, parking areas, tracker foundations, equipment pads, hiking trails, and water tank.

Temporary disturbance to the site consists of: trenching for electrical conduits, small areas with slopes greater than five percent, staging areas, and areas where equipment will roll on existing ground cover during deployment.

Approximately 4% of the site will be permanently disturbed, occupied by foundations for buildings, trackers, electrical equipment, roadways, general grading, etc. About 13% of the site will experience temporary disturbance during construction. These areas will be restored in accordance with the project's Draft Revegetation Plan (See Appendix C) including seeding with native California grassland species when installation is complete. Approximately 83% of the site will be left undisturbed.



An inactive gypsum mine is located in the southwest portion of the site and includes a large excavated area with nearby storage of mining equipment including abandoned trucks, bulldozers, and scrapers. In addition to closing the mine's permit, SunPower proposes to fill, restore and enhance the area to serve as a backdrop for the Visitors Center and entryway to viewing summits.

## **EROSION CONTROL**

Erosion control designs for the project will be prepared by a registered Civil Engineer in conformance with industry standards. A storm water pollution prevention plan will outline the various Best Management Practices (BMPs) and defining techniques for placement and maintenance. The erosion control plans will employ typical erosion control devices including straw wattles, check dams, fabric blankets, and silt fencing (See Sheet C4.9). All erosion control materials will be biodegradable and natural fiber.

## **UTILITIES**

Telephone and electrical power service for the project, will be placed underground.

## **WATER**

California Valley Solar Ranch will be served by a new, individual, on-site well. The two wells currently on-site are inoperable and not suitable to the needs of this project. One well is located at the abandoned farm house site. The other, a

boring with a six-inch PVC casing, is located near the southwest corner of the property and has no pump or other equipment and is not presently in use. Groundwater investigations are progressing and will inform the installation and development of a new well.

Water will be used during installation for concrete make-up and dust control. During Solar Ranch operations, water will be used for: commercial/office purposes, including the Visitors Center and O&M Building; and maintenance purposes, such as panel washing and dust control. Water-use calculations are based upon a consumption level of 20 gallons-per-day, per occupant, bringing the total usage to approximately 400 gallons/day. (See Sheet A1.1)

<b>Construction Phase</b>	<b>Daily Demand (Gallons)</b>	<b>Annual Water Demand (Acre-Feet)</b>
Concrete Manufacturing	8,500	9.5
Dust Control	11,000	12.3
Panel Washing	10,000	11.2
Sanitary Uses	3,000	3.4
<b>Total</b>	<b>32,500</b>	<b>36.4</b>
<b>Operation Phase</b>	<b>Daily Demand (Gallons)</b>	<b>Annual Water Demand (Acre-Feet)</b>
Panel Washing	10,000	11.2
Sanitary Uses	400	0.4
<b>Total</b>	<b>10,400</b>	<b>11.6</b>

## **WASTEWATER**

A septic tank and leach field will be constructed north of the Visitors Center to treat wastewater from the center and nearby assembly areas. A qualified soils engineer will direct leach field construction in an area of engineered fill using suitable soils necessary for system-appropriate percolation rates. No effects are anticipated on groundwater or any community wastewater service provider. No surface discharges are proposed, other than natural storm water runoff. The septic system and leach field design will meet applicable specifications. The project will use well water and will have no effect on any community water service provider. (See Sheets A1.0 and C4.4)

## **SITE CIRCULATION**

- Overhead obstructions will have a minimum vertical clearance of 13.5 feet.
- All access roads (perimeter and interior) will be improved to the same standard: 24 feet wide; two 10-foot travel lanes with two 2-foot shoulders with an aggregate base surface. (See Sheet C4.7)
- The site will not require wider aisles as those already shown on the site plan are sufficient for Cal Fire access. (See Sheet C1.0 & C3.0)
- Access to east-west aisles (shown at 17'-5" feet wide in Sheet C3.1) will be obtained via interior fire access roads within each array.

## **GENERAL SAFETY**

SunPower will implement a comprehensive health and safety program consistent with all applicable State and Federal laws and industry best practices to ensure California Valley Solar Ranch is built and operated in a safe, responsible manner

and presents a safe working environment for all employees.

Familiarity and adherence to safety policies and procedures will be required of all employees, throughout the installation period and during site operations.

Participation in safety briefings and protocol review will be mandatory.

## **FIRE SAFETY**

A defensible space around the site's perimeter, a 30-foot minimum clear zone and standard clearances around all structures will provide a primary fire safety zone at California Valley Solar Ranch. Additional fire safety and suppression measures include the following:

- The O&M building and Visitors Center will have fire sprinklers and a pressurized fire system.
- The required volume of water for fire use will be based on the number and sizes of structures, occupancy rating and material composition.
- Electrical structures including the substation and switchyard may be best served by alternate fire suppression (non-water) methods. If so, the required volume for fire suppression water will decrease accordingly.
- Standard defensible space requirements will be maintained surrounding any welding or digging operations will be maintained.
- All maintenance trucks will be equipped with a small water tank and pump.

In addition to individual fire safety measures onsite, California Valley Solar Ranch will be serviced by the California Valley fire station. This station is staffed 24-hours three days-a-week. The remaining four days are serviced by volunteer responders.



Installation of California Valley Solar Ranch will be phased over a 2.5 year period, currently scheduled to begin in 2010 and conclude by late 2012.

### **PRIMARY STAGING AREA**

A primary staging area, approximately 6 acres in area, will be constructed to handle major operations throughout the site's installation period. This area will include the facility's permanent operations and maintenance building (O&M building), two temporary covered assembly areas, a large fenced yard surfaced with aggregate base, employee parking, and a temporary concrete batch plant. The O&M building will include project office space, a first aid station and loading and unloading docks. This area will be serviced by portable toilets in addition to the permanent restrooms in the O&M building.

During peak installation times, up to 96 workers will assemble the individual tracker units and foundations within the covered assembly areas. The tracker units will then be loaded onto flatbed trucks for distribution throughout the site. Assembly rates will ramp up early in the installation period as the electrical infrastructure is built. Continuous tracker deployment onsite will begin halfway through Phase 1 and continue until the site is fully operational at the end of Phase 3.

### **INSTALLATION PHASES**

Installation of the Solar Ranch will occur in three phases, each phase lasting less than one year. (See Sheet C2.0)

Phase 1 will encompass general site improvements. Access points and fire access roads will be developed. Installation of the underground and overhead medium voltage collection system will begin along the fire access roads and between tracker rows. The substation and switchyard locations will be cleared, graded and constructed. The substation, switchyard and transmission lines will be completed during the first year of installation, allowing the Solar Ranch to begin operation as soon as the first tracker systems are deployed and generate solar power. This phase will also include the development of the primary staging area.

Phase 2 will extend the development of fire access roads and the medium voltage collection system as the site's arrays are installed. Temporary staging areas up to 6 acres in area will be constructed as needed to support installation of each array area for job trailers, outdoor storage space, first aid stations, employee parking and sanitary stations. Temporary lay down areas less than one acre in size will be constructed at the intersection of each fire access road. (See Sheet C2.1) The temporary staging and laydown areas will be deconstructed and overlaid with tracker units as installation progresses through the site.

Phase 3 will continue the progress in Phase 2 with additional road improvements, temporary staging and laydown areas, and infrastructure installation. As the arrays near completion, all temporary staging and laydown areas will be deconstructed and removed from site, the land will be reseeded and revegetated, and T20 Tracker units will be installed in those areas. (See Sheet C2.0) Once installation is complete, the primary staging area will be downsized and converted to contain an O&M Building, Visitors Center, office space and material storage facility. These permanent facilities will be serviced solely by the septic system and temporary restroom facilities will be removed.

## **PERSONNEL**

During the installation period, construction workers are planned to be onsite in three shift schedules: 7:00am-4:00pm, 8:00am-5:00pm, and 9:00am-6:00pm, 5 days-a-week, year-round, except for standard U.S. holidays. Due to extreme weather in the summer months (June-August), the construction crews may shift hours to start as early as 5:00am and end as late as 8:00pm, to allow for work during cooler hours of the day. Security personnel will be onsite every hour, every day during the installation phase, working in 8-hour shifts.

The Solar Ranch will be partially operational less than one year into the installation period, becoming fully operational once installation of the arrays is complete. The Solar Ranch will operate 7 days-a-week during daylight hours. During this time, O&M personnel will work in the O&M building and monitor the system's performance. The Visitors Center will be open for limited hours of operation and for scheduled tours and educational events. Security personnel will be onsite every hour, every day, working in 8-hour shifts.

## **PERSONNEL TRAFFIC**

During peak installation times, up to 276 workers may be onsite (96 working on assembly and 180 working on deployment and construction). Onsite job hours will be from 6:00am-6:00pm. Carpools and dedicated buses will be established for workers to commute to the site to reduce overall traffic to the site. A dedicated Park & Ride location will be designated in San Luis Obispo, Paso Robles and Bakersfield, with up to five shuttles running from each location. Shuttles will arrive at the Solar Ranch from 6:00am-9:00am and depart from 3:00pm-6:00pm, corresponding with the start and end times of each work shift: 7:00am-4:00pm, 8:00am-5:00pm, and 9:00am-6:00pm. Construction traffic originating in Kern County (Bakersfield) will be directed along SR-58 West. Traffic originating in San Luis Obispo County (San Luis Obispo and Paso Robles) will be directed along Highway 46 to Bitterwater Road or Shell Creek Road. Traffic routes will be reviewed in consultation with CalTrans and County Public Works.

## **DELIVERY TRAFFIC**

A majority of all equipment will be delivered to the site in standard width and length 53' covered vans or 48' flatbed trailers. Substation equipment and cranes will be delivered to the site on wide load trailers. These trailers will require pilot cars and are not expected to make more than 30 round trips throughout the installation period. Types of deliveries and the corresponding vehicles are as follows:

### Solar Panels

- standard width 53' van

### Inverters

- standard width 48' flatbed trailer

### Tracker Steel

- standard width 48' flatbed trailer

### Concrete Materials

- standard width dump truck

### Transmission Poles

- standard width 48' flatbed trailer

### Substation circuit breakers

- standard width 48' flatbed trailer

### Substation Steel

- standard width 48' flatbed trailer

### Substation Transformers

- 48' lowboy trailer with pilot cars
  - auxiliary equipment substation equipment delivered on a standard width 48' flatbed trailer

### Cranes

- 35 ton crane: 48' wide load lowboy trailer with pilot cars
- 60-100 ton crane: wide load self propelled trucks with two jib companion flat beds

Deliveries will be intermittent throughout the day. A majority of the delivery and truck traffic will travel along Highway 46 to Bitterwater Road or Shell Creek Road as determined through consultation with CalTrans and County Public Works. There will be up to 50 vehicles onsite throughout installation which will not use public roads.

## California Valley Solar Ranch Traffic Information

Traffic Type	Total Roundtrips During Construction	Daily Construction Roundtrips	O&M Post Construction Daily Traffic
Access Road Aggregate Base Material	8,248	11	
Concrete Raw Material	27,600	37	-
PV Module Delivery Trucks	3,000	4	-
Steel Tracker Components	3,300	4	
Transmission Towers	60	8	
Substation, Switching Station Equipment	1,200	13	
Electrical Bill of Materials	1,575	2	
Worker Car and Bus Trips	36,288	50 Vehicles (15 buses with 20 people per bus & 35 individual vehicles)	16 Vehicles
Vehicles only using onsite roads	-	50 Vehicles	2 Vehicles 4 Gators
Total:	81,271	129	-

## ON-SITE VEHICLE MOVEMENT INSTALLATION

### Vehicles entering and traversing the site

During installation, all traffic will enter the site at the main project entry along SR-58 at Boulder Creek Road. Here, there will be a required security check-in point where all vehicles will then be directed to the appropriate area onsite.

Temporary parking will be adjacent to the security check-in point to avoid back-up on SR-58. All vehicles will travel along fire access roads to traverse the site. An inclement weather, a traffic control plan will limit disturbance to onsite roads.

### Tracker row installation

Vehicles needed for installation of the site's tracker units will travel on temporary construction access roads within the site's array sections.

A forklift, or truck-mounted crane, and flatbed truck carrying pre-cast concrete tracker foundations will place the foundations to the north and south of each temporary access road traversed. This limits vehicle traffic to every other tracker row. A flatbed truck carrying pre-assembled T20 Tracker units will follow down the same road, placing the T20 Trackers onto the foundations.

Lightweight vehicles will be used to access each tracker for wiring. When possible, all vehicles traversing through each row will travel from east to west or vice versa. When this is not possible, vehicles will reverse out of the temporary construction access road.

## **ON-SITE VEHICLE MOVEMENT OPERATIONS**

Once installation is complete and the site is fully operational, all traffic (staff and visitor) will enter the site from SR-58 at Boulder Creek Road. To access the Visitors Center, vehicles will travel along Boulder Creek Road. Aside from the Visitors Center, hiking trails and viewing areas, the facility will be restricted to O&M staff and security personnel only. The O&M staff will use lightweight vehicles and all-terrain vehicles for traversing the site along fire access roads.

### Security

Security staff will traverse the site 24/7 in lightweight vehicles and all-terrain vehicles primarily along perimeter fire access roads.

### Maintenance

Maintenance staff will traverse the site in lightweight vehicles and all-terrain vehicles.

### Panel Washing

Panel washing crews are scheduled to clean the panels twice per year. They will traverse the site in a purpose-built lightweight to medium duty truck which will be fitted with a water tank and air compressor to operate a high-pressure sprayer and cleaning brush system.



### OPERATIONS

The full-time staff of the Solar Ranch is expected to consist of 1 site manager, 4 technicians, and 6 security personnel. Additionally, wash crews of approximately 4 workers will be employed to keep the PV panels clean to maximize performance.

A major focus of the operations of the Solar Ranch is monitoring system operational status, performance, and diagnostics from the main control room in the O&M Building. System production forecasting and scheduling with PG&E and the California ISO will also occur in the O&M Building along with operational planning. Operations activities will also include meter reading and production reporting along with updating O&M manuals. Visitor and educational tours are expected to be a regular part of the operational activities of the Solar Ranch.

#### Security

Security monitoring will also occur from the Solar Ranch's main control room and through visual inspection from routinely driving the perimeter roads. The Solar Ranch will be equipped with day/night closed circuit security cameras throughout including motion detection triggering automatic recording, video recording & analysis, and an intelligent video management system. The Solar Ranch will also be equipped with a perimeter detection system and a perimeter position system with an intelligent analytics to distinguish between different signal events and locate their position.

## **MAINTENANCE**

### Preventative Maintenance

- System testing to ensure the Solar Ranch is operating at peak performance
- Walk-downs to perform visual inspections of array mechanical components, PV mounting systems, and PV modules
- Visual inspection of AC and DC electrical components, including conductors, conduit, connectors, fused and unfused disconnects, and switchgear
- Inspection of tracker control enclosures and components
- Inverter inspection and cleaning of fans and enclosures
- Annual lubrication of worm gear lubricant
- Testing of DC array circuits
- Check torque on electrical terminations throughout system
- Check torque on mechanical connections throughout system
- Meter reading
- Routine system maintenance to include correction of loose electrical connections, ground connections, replacement of defective modules found during testing, other minor maintenance repair work
- Landscape maintenance

### Corrective Maintenance

- Replacement of broken or non-functioning PV
- Tracker troubleshooting and repair
- DC and AC circuit troubleshooting and repair, including fault situations
- Monitoring equipment and sensor troubleshooting and repair
- Major system repairs
- System troubleshooting and repair both in the field and in the O&M shop

### Washing

To optimize performance of the Solar Ranch, the solar PV panels will be washed periodically. It is anticipated that two washings per year will be sufficient. No chemicals are used. Wash water is softened with a sand filter system to prevent spotting. Panels are sprayed with high pressure water and agitated with a brush to loosen dust and dirt and sprayed again to wash clean.

### Lighting

All lighting fixtures will be constructed and maintained so as to be shielded so that neither the lamp or the related reflector interior surface is visible from adjacent properties. Light hoods will be dark colored. Permanent lighting will be restricted to the O&M building and Visitors Center area, switchyard, substation and main project entry intersection at SR-58.

### Noise

Noise from the Solar Ranch during operations will be limited to light duty vehicle traffic for security patrols, maintenance staff, and wash crews. High voltage transmission lines and transformers make a low level of noise. See the following chart for relative noise levels.

<b>Typical Sound Levels for Select Noise Sources</b>		
<b>Type Of Activity</b>	<b>Sound Level In Decibels (dB)</b>	<b>Subjective Impression</b>
Civil Defense Siren (100 feet)	140	Pain Level
Jet Takeoff (200 feet)	120	Pain Threshold
Loud Automobile Horn (3 feet)	115	Extremely Loud
Jet Takeoff (2,000 feet)	105	Very Loud
Pile Driver (50 feet)	100	Very Loud
Freight Cars (50 feet)	95	Very Loud
Heavy Truck (50 feet)	90	Very Loud
Ambulance Siren (100 feet)	90	Very Loud
Riding Inside a City Bus	83	Loud
Pneumatic Drill (50 feet)	80	Loud
Alarm Clock (2 feet)	80	Moderately Loud
Average Traffic on Street Corner	75	Moderately Loud
Freeway (100 feet)	70	Moderately Loud
Vacuum Cleaner (10 Feet)	69	Moderately Loud
<b>Conversational Speech</b>	<b>60</b>	<b>Medium</b>
Department/Large Retail Store	60	Medium
<b>Light Auto Traffic (100 feet)</b>	<b>55</b>	<b>Medium</b>
<b>Large Transformer (200 feet)</b>	<b>40</b>	<b>Quiet</b>
Library	35	Quiet
Soft Whispering (5 feet)	30	Quiet
<b>Transmission Line</b>	<b>20</b>	<b>Quiet</b>
Hearing Threshold	10	Very Quiet

Sample Table of Noise Levels for Selected Noise Sources

## DECOMMISSIONING

The same features of SunPower's T20 Tracker technology that contribute to the low impact nature of its deployment also make it simple to de-commission. If at the end of the contract term to sell energy to the utility buyer, no contract extension is available or no other buyer of the energy emerges, the solar plant can be de-commissioned and dismantled.

The solar PV panels will still have a useful life and will still be capable of producing electricity. The panels are warranted for 25 years with a design life of

35+ years. Solar PV arrays such as the one installed in 1984 by Sacramento Municipal Utility District (SMUD) at its shuttered Rancho Seco Nuclear power plant are still providing electricity to the residents of Sacramento after 25 years of operation. And some of the original solar PV cells invented by Bell Labs in 1954 are still functioning more than 50 years later.

De-commissioning would first involve removing the panels for sale into a secondary solar PV panel market. We expect a robust global market for used solar PV panels. Global electricity demand continues to rise and electricity prices are projected to continue their steady increase. Demand for solar energy is rapidly accelerating and is expected to grow for decades to come. And third world off-grid applications are expected to boom as used PV panels become available at a fraction of today's cost.

The majority of the components of a solar PV installation are easily removed from the site and are made of materials that can be readily recycled. The tracker structures and mechanical assemblies are made from galvanized steel. The surface mounted footings and equipment pads are made from concrete. The wiring is made from copper and/or aluminum. Equipment such as drive controllers, inverters, transformers, and switchgear can be either re-used or their components recycled.

Underground conduit and wire can be removed by uncovering trenches and backfilling when done. Poured concrete pads can be removed for recycle or used as clean fill. Appropriate erosion control measures will be utilized throughout the decommissioning process, and a re-vegetation plan will be implemented to repair any temporary disturbance from de-commissioning activities. This would be very similar to the detailed re-vegetation plan outlined to repair temporary disturbance from installation activities.

Precedence exists in this area for solar PV plant de-commissioning. The ARCO Solar PV installation that was in operation from 1983 to 1994 was dismantled in the late 1990s. The land is currently in use for dry farming, the same as its prior use and the current use of adjacent parcels. Many of the panels have been put into productive use on a small scale at individual ranches and residences in the local area to offset a portion of their grid power.

## **SUMMARY**

The project site has been selected and the overall design has been formulated with the intent of minimizing physical changes to the land, and thus avoiding or minimizing impacts as much as possible. Since it does involve a new use on the property and does involve new construction, there will be some physical changes. In many instances, mitigation measures are already identifiable in the form of applicable laws, ordinances, or regulatory requirements that apply to this or any project. With other issues, SunPower has identified specific mitigation measures that can be implemented with the project in order to avoid or lessen environmental effects. A brief description of these mitigation measures follows. These and other mitigation activities will be developed further through the project review process.

## **AESTHETICS**

While the project will alter the appearance of the property, the layout of the photovoltaic arrays has been designed to conform to the topography of the site and to retain several open corridors along drainage channels. The dominant appearance of the solar arrays is consistent, uniform, and low profile, which is more reminiscent of agricultural features such as vineyards, orchards, row crops, frost canopies, or similar repetitive features, rather than that of a major power plant or other industrial installation.

Other specific design features intended to reduce visual intrusiveness include:

- Preservation of adjacent lands for agricultural and conservation purposes, retaining the natural landscape along the north side of SR 58, backdropped by the Temblor Range (See Sheet C1.0).
- Setback of 265 feet from SR 58 to nearest points on arrays, and 1,037 feet to substation structure. (See Sheet C1.2)
- Landscaping, entrance treatments, fencing plan, and other features to provide an aesthetic treatment (See sheets L1.0 and following).
- Use of minimum necessary nighttime lighting for security purposes, designed to eliminate glare or spillover to areas outside of the project site.

## **AGRICULTURE**

None of the project lands are contracted under the Williamson Act. There are no prime agricultural soils (Class I, II, or III) on the property. (See Sheet G1.6) In addition there are no prime agricultural lands as mapped by the California Department of Conservation (Unique Farmlands, Farmlands of Statewide Significance or Farmlands Local Importance). There has been no significant crop production from the land for many years. The project will not cause any adverse change to agricultural production. The project is compatible with continued agricultural uses on adjacent lands, which currently include limited crop production and grazing.

## **AIR QUALITY**

The generation of electricity from solar PV produces no emissions. In fact, the major benefit of solar energy production is to offset carbon emissions associated with conventional power generation. Yet it is recognized that the project will have



some air emissions associated with construction traffic and activities at the site. During its operation, there will be minimal emissions associated with vehicle use for security and maintenance purposes and visitor traffic.

Current plans for project implementation incorporate several features to minimize air emissions. The details for these measures will be developed during project review and final project design. They include:

- Use of on-site Portland cement concrete batch plants to manufacture the tracker ballast or foundations on-site reduces transport truck trips.
- The use of busses and/or van pools to transport workers during construction phases.
- Dust control during construction by applying water as necessary, and during the life of the project by retaining grassland vegetation beneath arrays and along interior access rows.
- The incorporation of energy conservation features into the building design.

## **BIOLOGICAL RESOURCES**

The preliminary Biological Resource Assessment Report contains a review of habitats and sensitive species on the property. This information was used extensively in developing the layout for the photovoltaic arrays and other facilities on the project site. Measures incorporated into the project to avoid or minimize effects on biological resources include the following:

- Avoidance of areas of relatively high sensitivity, including:
  - Atriplex scrub habitat, Interior Coast Range scrub and Wildflower Field, Retired dry-farmed field, (all north of SR 58) (See Sheet G1.4)
  - alkalai sink habitat (south of SR 58) (See Sheet G1.4)
  - lower elevation areas that contribute drainage to offsite vernal pools (Northern Claypan Vernal Pool habitat)
  - dry drainages (See Sheet C4.8)
- Retention of land within the SunPower parcels for continued agricultural and conservation purposes.
- Design of array foundations and supporting structures that preserves most of existing grassland ground cover and habitat for prey species of the San Joaquin Kit Fox (SJKF).
- Fencing program that includes sizing of opening to allow passage by SJKF and their prey species. (See Sheet L2.1)
- Re-vegetation plan that incorporates California annual grassland species on areas of temporary disturbance. (See Sheet L5.0)

Additional measures to minimize adverse effects on resources are suggested in the Biological Resources Assessment Report.

## **CULTURAL RESOURCES**

The results of a Cultural Resources Review and Preliminary Assessment of the property indicate a low likelihood of important cultural resources on the property, and a low potential for impacts. These conclusions, along with specific mitigation measures, will need to be confirmed through subsequent survey and review.

## **GEOLOGY AND SOILS**

Preliminary geotechnical and soils studies have been conducted by ENGEO Incorporated for the project. No habitable structures are included within the project area near the San Andreas Fault zone. A setback from San Andreas Fault is provided for the photovoltaic arrays. (See Sheet C1.2) Array boundaries were designed to exclude lands within Alquist-Priolo Earthquake Fault Zones. The structural design of the array foundations and supports, the transmission towers, substation, switching station, and on-site structures will account for anticipated ground shaking. (See Sheet G1.5)

Expected project grading amounts on the project site for T20 Tracker foundations, facilities, utilities, fire road, and aggregate base maintenance road total 366,000 cubic yards of cut and fill and 246,000 cubic yards of export over 765 acres (584 acres of this will be temporary disturbance and 181 acres will be permanent). Several existing small hills will be graded (i.e., cut or excavated) to a slope that is acceptable for the T20 Tracker foundation mounting. (See Sheets C4.0 through C4.2) Solar arrays will then be placed in the lower-sloping areas previously occupied by the hills. Grading for the buildings and other project features is shown in Sheets C4.3 through C4.7.

The project design retains the major drainage patterns on the property (See Sheet C4.8), and incorporates retention basins and other features to maintain natural flows and prevent erosion. (See Sheets C4.8 and L5.1) No major structures are proposed in areas of inundation. (see Sheet G1.3)

The project will not restrict access to any mineral deposits. The existing gypsum deposit on the property is mined out and has been unused for many years. It is proposed to close out the mine's permit as part of the project.

## **HAZARDS AND HAZARDOUS MATERIALS**

All fuels, fluids, components with hazardous materials/wastes will be handled in accordance with applicable regulations. All such materials will be kept in segregated storage with secondary containment as necessary. SunPower will maintain all records of storage and inspection and will provide for proper offsite disposal.

Circulation and access for fire protection purposes will be provided; with road widths and design consistent with County Fire Department requirements. (see Sheet C3.0 for locations of roadways)

## **NOISE**

Noise from the Solar Ranch during operations will be limited to light duty vehicle traffic for security patrols, maintenance staff, wash crews and the sound of electrical equipment. High voltage transmission lines and transformers make a low level of noise. See the chart in the Maintenance section (page 42) for relative noise levels. The project design places the substation and switchyard far from existing residences. Generous perimeter buffers are also provided. (See Sheets C1.0, C1.1 & C1.2)

## **POPULATION/HOUSING**

The project is not expected to have any effect on population or housing. The project will neither require nor displace housing.

## **PUBLIC SERVICES/FACILITIES**

The project is not expected to have a significant effect on fire protection services. SunPower will provide 24-hour security at the site and maintenance personnel capable of responding to any upset conditions or emergencies. The project is not expected to have a significant effect on police protection.

The project will not adversely affect solid waste services. For the photovoltaic arrays, which comprise most of the project, the construction materials are primarily SunPower pre-fabricated structural members and involve very little waste. Construction debris and waste from buildings and other improvements will be recycled.

The project will not require any public service extensions. Water will be from on-site well, storage, and delivery system. Wastewater will be treated and disposed in an on-site septic and leach field system. Electrical service is available at the site.

## **RECREATION**

To the extent the project attracts visitors, it may lead to a minor increase in awareness of and visitation to the Carrizo Plains National Monument. This is not considered an adverse effect.

The project will have no adverse effect on existing recreation facilities. It will provide amenities including a Visitors Center, an internal walking trail, observation points, and interpretive information. (See Sheets C1.0 & L Sheets) There are no existing public trails or parks involved with project site, and none will be affected by project.

## **TRANSPORTATION/CIRCULATION**

The project will involve an increase in traffic, mainly during construction. The project will include bus transportation and/or van pools for construction workers. The preliminary plan for construction traffic involves using Bitterwater Road or Shell Creek Road south from SR 46 for the import of solar panels and support structures, and other construction materials. This route will avoid the steep and winding portions of SR 58, and will minimize conflicts with commuter traffic between California Valley and areas to the west.

Delivery schedules will be developed with sensitivity to resident commuter and school bus routes and schedules. Most on-site construction materials will be imported on conventional heavy duty trucks. Thirty oversized loads are anticipated for on-site construction. Adequate emergency access & internal fire roads are provided in the project design. The project design includes adequate internal parking and access roads. There are no public transit, bicycle, or pedestrian routes involved with project, and the project will have no effect on air traffic.

## **WASTEWATER**

An on-site septic system and leach field is proposed, and will meet all specifications of the County Health Department and the Regional Water Quality Control Board. (See Sheets C4.4 & A1.0) No effects are anticipated on groundwater or any community wastewater service provider.

## **WATER**

No surface discharges are proposed, other than natural storm water runoff. The septic system and leach field design will meet applicable specifications; there will be no effect on groundwater. The project will use well water and will have no effect on any community water service provider.

## **LAND USE**

The project is consistent with Agriculture land use designation on the property, and is an allowed use with a Conditional Use Permit (CUP). The project is compatible with adjacent agricultural uses and is consistent with the intent of agricultural uses and policies. The project is also consistent with the County Energy Element and the APCD Clean Air Plan.

There are no adopted habitat conservation plans or natural community conservation plans in the area; therefore, the project will have no effect in this regard. The region is an important part of the range and habitat for the San Joaquin Kit Fox. Agency consultations are ongoing regarding this species.